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TAXONOMIC STATUS OF *SYNSYNELLA* HAY AND
BOPYRO PEARSE (ISOPODA: BOPYRIDAE)

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Two genera of Bopyridae, *Synsynella* Hay and *Bopyro* Pearse have had an interesting history. *Synsynella deformans* Hay (1917) was described from Onslow Bay, North Carolina, as a parasite of *Synalpheus longicarpus* (Herrick). Chopra (1923) described a species, that superficially resembled *S. deformans*, as *Bopyrella deformans indica*, thus synonymizing *Synsynella* Hay with *Bopyrella* Bonnier. However, Chopra's species has 5 pairs of biramous pleopods, whereas Hay's *Synsynella* has only 4 pairs, none of which is biramous. Nierstrasz and Brender à Brandis (1929) apparently accepted Chopra's erroneous conclusion that *Synsynella* Hay had 5 pairs of biramous pleopods, but because both the first and second peraeonites were fused with the cephalon in the adult female, and not just the first peraeonite as in *Bopyrella*, they reinstated *Synsynella*. Nierstrasz and Brender à Brandis (1929) also erected a closely related genus, *Prosynsynella*, and remarked that the adult female was indistinguishable from what they called *Synsynella deformans* Hay: "Diese Gattung (*Prosynsynella*) ist *Synsynella* nah verwandt. In der Tat sind die Weibchen nicht von einander zu trennen" (Nierstrasz and Brender à Brandis, 1929, p. 36). Monod (1933) illustrated a specimen which fits the characteristics of *Synsynella* as modified by Nierstrasz and Brender à Brandis, that is with all

peraeonites dorsally fused in the adult female. This he called *Synsynella deformans* Hay var. *indica* Chopra.

Bopyro was established by Pearse (1932) for *Bopyro choprae* from Tortugas, Florida, from *Synalpheus brooksi* Coutiere. The only other reports of *B. choprae* known to us are by Pearse (1950) from Onslow Bay, North Carolina, on *S. longicarpus* and *Synalpheus minus* (Say), and Pearse (1951) from Bimini on *S. brooksi*. In a recent study (Menzies and Kruczynski, in press) we concluded that *Bopyro* was a synonym of *Synsynella*, but because we lacked type-material, a definite union of these genera remained in doubt. We have now examined holotypes of *S. deformans* and *B. choprae* and herein confirm our union, and provide necessary corrections in the previous descriptions.

Synsynella Hay 1917

Synsynella Hay 1917:571-572.—Menzies and Kruczynski, in press.
Bopyro Pearse 1932:1-3.

Type-species: *Synsynella deformans* Hay 1917.

Type-locality: Onslow Bay, North Carolina, from branchial cavity of *Synalpheus longicarpus* (Herrick).

Emended diagnosis: Female (Fig. 1 A-C). Branchial parasite. Body slightly asymmetrical, tapering posteriorly. Cephalon quadrate with anterolateral processes, one sharper than other and recurved. Eyes present. Cephalon fused middorsally with peraeonites I and II. Peraeonites III-VII separated dorsally. Coxal plates on peraeonites I-IV, visible in dorsal view on peraeonites II-IV. Six pleonites indicated laterally, fused on mid-dorsum. Terminal pleonite bifid. Four pairs of uniramous pleopods. Marsupium open ventrally, with 5 pairs of oostigites. Uropods lacking.

Remarks: This diagnosis differs from Hay's generic diagnosis in the description of coxal plates and pleopods. Hay described the female as follows: "First four abdominal segments completely fused in middle region, but free at the sides; last two segments completely fused; other segments distinct. Pleopods usually rudimentary but with indications of being biramous." Hay also gave as a species characteristic "Epimeral plates present on the second, third and fourth segments on both sides of the body, but smaller on the short side." We found coxal plates on the first 4 peraeonites on both sides.

Hay did not designate an allotype, and illustrated in photographs 2 very different males. He described one as abnormal with only 3 pleonites. We feel that it is possible that Hay confused several species in his diagnosis. This supposition is supported by our examination of female

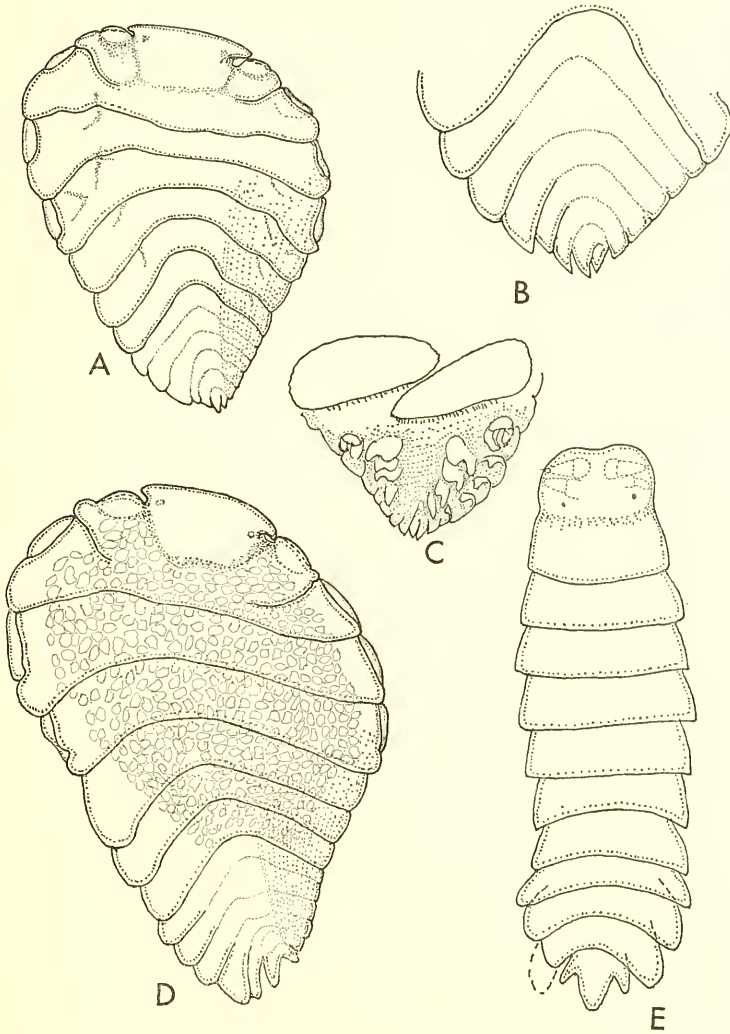


FIG. 1. A-C, *Synsynella deformans* holotype female, $l = 5.2$ mm, $w = 4.5$ mm: A, Whole animal, dorsal view; B, Pleon, ventral view; C, Pleon, dorsal view. D, *Bopyro choprae* holotype female, $l = 6.2$ mm, $w = 4.3$ mm, whole animal, dorsal view; E, *Bopyro choprae* allotype male, $l = 1.2$ mm, $w = 0.4$ mm, whole animal, dorsal view.

paratypes of *S. deformans*. Of the 3 paratypes examined, we found 2 with pleopods like those described for the holotype; however the shape of the pleon of these is different from the holotype in having the sixth pleonite being widely separated. The third specimen has 3 biramous pleopods and a fourth bilobed pleopod. Also, this latter specimen has the second peraeonite free, not fused with peraeonite I. Due to lack of information on the range of intraspecific variation in bopyrids in general, and due to the absence of males in the type-collection, we hesitate to describe these paratypes as new species or genera.

Hay's diagnosis of *Synsynella* as emended fits the holotype of *Bopyro choprae* (Fig. 1 D). In fact the holotype of *B. choprae* resembles the holotype of *S. deformans* more closely than do female paratypes of *S. deformans*. Thus, we consider *Bopyro choprae* a synonym of *Synsynella deformans*.

Previous distinctions between *Bopyro* and *Synsynella* were based on errors in Pearse's original illustration and interpretation. There is no need to cite each error, but the holotype clearly has the cephalon fused with the first 2 peraeonites, coxal plates on peraeonites I-IV, and dorsally fused pleonites. Examination of 34 female topotypes demonstrated variation among several characteristics used in distinguishing bopyrids. The shape of the terminal pleonite varied from bluntly pointed to sharply pointed (Fig. 2 A-D). The last 2 pleonites were missing on one specimen removed from a host (Fig. 2 E). There was also variation in the length of the fifth pleonite on the long side of the body and in the depth of lateral indications of pleonites of the short side of the body (Fig. 2). All specimens had 4 uniramous pleopods. Pleopod 4 was conical in all, but the first 3 pleopods were either bilobed or simple unilobed quadrate appendages. There was no apparent association between body size and lobing of the anterior pleopods. Thus, this characteristic mentioned by both Hay and Pearse is probably altered in fixation. However, it is important to note that the number of pleopods did not vary and that biramous pleopods were not found among this series of females.

The size of topotype females ranged from 1.5-3.8 mm length ($\bar{M} = 2.5$) and 0.8-2.8 mm width ($\bar{M} = 1.7$). Approximately equal numbers were removed from the right (56%) and left (44%) branchial chambers of host shrimps; one shrimp had both branchial chambers infected, and one parasitized shrimp was ovigerous. All except 2 specimens were observed with the posterior end situated toward the head of the host, and 8 females had males attached to the ventral surface of the pleon.

The allotype of *B. choprae* (Fig. 1 E) had the cephalon fused dorsally with peraeonite I and 4 free pleonites, the last being trilobed. Pearse, like Hay, may have had more than one species at his disposal when he described *B. choprae* as is suggested by the different male pleons he illustrated. Our examination of the 8 male topotypes and a male collected by Markham from the type-locality demonstrated little morphological variation of the pleonites or other characteristics. The

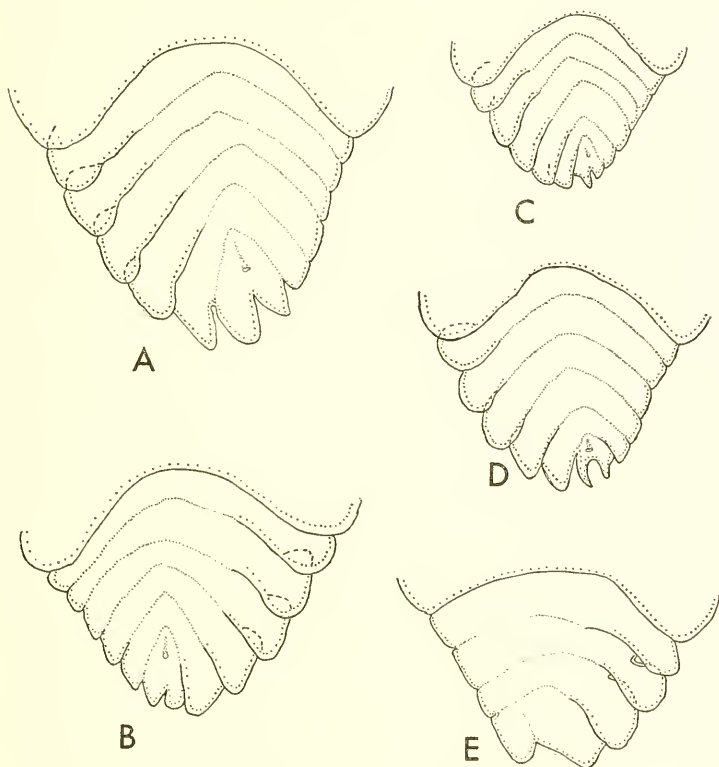


FIG. 2. A-E, Variation in pleon of 5 totopype females of *Bopyro choprae*.

only variation observed was in the shape of the central lobe of the last pleonite which varied from pointed to bluntly pointed. Males ranged in size from 0.5–0.9 mm length ($\bar{M} = 0.8$) and 0.1–0.3 mm width ($\bar{M} = 0.2$).

Material examined: *Synsynella deformans* Hay, holotype female, USNM 48371. *Synsynella deformans* Hay, paratype females, USNM 48372; paratype 1 may not be *Synsynella*-peraeonite II distinct dorsally, pleopods 1–3 biramous (examined by Bourdon, 1972); paratypes 2 and 3 with pleon more rounded distally than holotype, and last pleonite widely bifid—may be different species. *Bopyro choprae* Pearse, holotype female and allotype male, USNM 64488. *Bopyro choprae* Pearse, 34 females, 8 male totopypes, USNM 117110. *Bopyro choprae* Pearse, J. C. Markham ident., female and attached male, USNM 311208; the terminal

pleonite resembles that of holotypes of both *S. deformans* and *B. choprae*; the male is identical with the allotype *B. choprae*.

DISCUSSION

The taxonomy of the Bopyridae is quite confused. The subfamily to which *Synsynella* belongs, the Bopyrinae, is, as Nierstrasz and Brender à Brandis indicated in 1929, in need of major revision. Perhaps the main reason for confusion is the lack of any study of variability of characters within species. We examined 34 additional specimens of *B. choprae* and have discussed the characters that were variable. Dorsal demarkation of peraeonites and pleonites may be obscured at times, depending on the position of the parasite within the branchial cavity of the host. We believe that the type of articulation between the cephalon and peraeonites I and II, the number of coxal plates, and the number of pleopods and their configuration are taxonomic characters of generic importance. Also, the characteristics of males likely to show little variation are articulation of cephalon and peraeonite I, number of antennal articles, number of pleonites and pleopods, and shape of the pleon.

The characteristics which caused confusion for both Chopra (1923) and Nierstrasz and Brender à Brandis (1929) was the determination of the number and branching of pleopods. First, unlike Chopra's species, *S. deformans* has only 4 pairs of pleopods, none of which is biramous but may be bilobed in preserved specimens. Thus Chopra's "subspecies" is hardly a subspecies of *deformans* and may or may not belong to *Bopyrella*.

A serious problem in the examination of Bopyrinae is determining dorsal fusions of peraeonites and pleonites. Because of the significance of these fusions, their presence or absence must be carefully noted. We have found it very useful to stain whole female specimens with hematoxylin. In this way articulations are determined by clear, continuous dorsal demarkations. The fused segments may or may not show in reflected light as shallow, linear depressions, lacking a discrete border. Obviously, investigators will differ in their interpretation of a shallow line separating somites as a true separation, and because of this most previous descriptions of Bopyrinae should be examined with the possibility that fusions may or may not exist.

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